

## REMARKS

This Amendment responds to the Office Action dated December 11, 2006 in which the Examiner rejected claims 1, 8, 11 and 31-37 under 35 U.S.C. §103.

As indicated above, claims 1 and 33 have been amended in order to make explicit what is implicit in the claims. The amendment is unrelated to a statutory requirement for patentability.

Claim 1 claims a head slider with a precise positioning actuator, comprising a thin plane shaped head section and an actuator section. The thin plane shaped head section is provided with a first surface that is substantially perpendicular to an air bearing surface of the head slider, a second surface opposite to the first surface, side surfaces perpendicular to the first and second surfaces, and at least one head element formed on the first surface. The actuator section is for precisely positioning the at least one head element. The actuator section includes a) a pair of movable arms, b) a base and c) a static part. The base is to be fixed to a support means of the head slider. The pair of movable arms extends from the base to form a U-shape. The static part is coupled with the base between and spaced from the pair of movable arms to form an E-shape. The static part is spaced from the head section. Each movable arm comprises an arm member made of zirconia and a piezoelectric element formed on or fixed to a surface of the arm member.

Through the structure of the claimed invention having a base and pair of movable arms forming a U-shape and having a static part coupled with the base and between the pair of movable arms to form a E-shape, as claimed in claim 1, the claimed invention provides a head slider with a precision positioning actuator in which no displacement will occur at the air bearing surface so that the attitude of the

air bearing surface will not change in order to keep a stable flying characteristic of the slider. The prior art of record does not show, teach or suggest the invention as claimed in claim 1.

Claim 33 claims a head slider with a precise positioning actuator, comprising a thin plane shaped head section and an actuator section. The head section is provided with a first surface that is substantially perpendicular to an air bearing surface of the head slider, a second surface opposite to the first surface, side surfaces perpendicular to the first and second surfaces and at least one head element formed on the first surface. The actuator section is for precisely positioning the one head element. The actuator section including a) a pair of movable arms, b) a base and c) a static part. The moveable arms are capable of displacing its top end portions in response to a drive signal applied to the actuator section. Both of the side surfaces of the head section are fixed to the top end portions of the pair of movable arms. The base is to be fixed to a support means of the head slider. The pair of movable arms extends from the base along the air bearing surface to form a U-shaped. The static part is coupled with the base between the pair of movable arms to form an E-shape. The static part spaced from the pair of movable arms and the head section via a gap. Each movable arm comprises an arm member made of zirconia and a piezoelectric element formed on or fixed to a surface of the arm member.

Through the structure of the claimed invention having a base and pair of movable arms form a U-shape and having a static part coupled with the base between the pair of movable arms to form a E-shape, as claimed in claim 33, the claimed invention provides a head slider with a precision positioning actuator in

which no displacement will occur at the air bearing surface so that the attitude of the air bearing surface will not change in order to keep a stable flying characteristic of the slider. The prior art does not show, teach or suggest the invention as claimed in claim 33.

Claims 1, 8, 11 and 31-37 were rejected under 35 U.S.C. §103 as being unpatentable over *Yanagisawa* (U.S. Patent 6,487,045) in view of *Novotny* (U.S. Patent 6,289,564) and *Takeuchi et al.* (U.S. Patent 6,404,109).

*Yanagisawa* merely discloses a slider substrate 11, floating plane 13 formed on the surface of slider surface 11, a piezoelectric element 14 sandwiched by electrodes 15a and 15b and a recording/reproducing element 12. (Column 8, lines 39-47).

Thus, *Yanagisawa* merely discloses a slider substrate 11 with floating plane 13 and recording/reproducing element 12. Nothing in *Yanagisawa* shows, teaches or suggests a) a base and pair of movable arms forming a U-shape and b) a static part coupled with the base between the pair of movable arms to form a E-shape, as claimed in claims 1 and 33. Rather, *Yanagisawa* only discloses a rectangular slider substrate 11 with floating plane 13 and recording/reproducing element 12.

*Novotny* appears to disclose in FIG. 2 a top view and FIG. 3 is a side view of slider 24 including piezoelectric microactuator 42a and structural element 42b to enable high resolution positioning of head 41. Slider 24 includes a head portion 40 carrying transducing head 41 and also includes air gap or space 44 between head portion 40 of slider 24 and the remaining portion of slider 24. Microactuator 42a and structural element 42b are disposed on the side surfaces of slider 24 near its distal end, connecting head portion 40 to the remainder of slider 24. Microactuator 42a is a

structural element operable as a bendable cantilever to alter the position of head portion 40 with respect to main portion 38. (Column 3, lines 42-54). FIG. 5 is an enlarged top view of the distal portion of slider 24 illustrating the construction of piezoelectric microactuator 42a. (Column 4, lines 22-24). Structural layer 60 is composed of silicon nitride ( $\text{Si}_3\text{N}_4$ ) or polysilicon. Buffer layer 62 is preferably composed of silicon dioxide ( $\text{SiO}_2$ ) or titanium dioxide ( $\text{TiO}_2$ ). Adhesive layer 64 is preferably composed of titanium (Ti) or tantalum (Ta). Bottom electrode 66, shared electrode 70 and top electrode 74 are preferably formed of platinum (Pt). Piezoelectric elements 68 and 72 may be composed of zinc oxide (ZnO), lead zirconium titanate ( $\text{PbZrTiO}_3$ , known as PZT), aluminum nitride (AlN) or polyvinylidene fluoride (PVDF). (Column 4, lines 39-48).

Thus, *Novotny* merely discloses a head 40, a slider 24, an air gap 44 formed between the head and slider and structural elements 42a, 42b. Nothing in *Novotny* shows, teaches or suggests a static part spaced from the pair of movable arms and the head section as claimed in claims 1 and 33. Rather, head section 40, which the Examiner states is the static part includes the transducer head 41 and thus cannot be spaced from the head section as claimed in claims 1 and 33.

Additionally, structural elements 42a, 42b connect the head 40 to slider 24. Therefore nothing in *Novotny* shows, teaches or suggests the static part is spaced from the moveable arms via a gap as claimed in claims 1 and 33. Rather, *Novotny* teaches away from the claimed invention since the elements 42a, 42b connect the head 40 to slider 24 (column 3, lines 49-51).

*Takeuchi et al.* appears to disclose a material for constructing the movable section 20 and the fixation section 22 is not specifically limited provided that it has

rigidity. However, it is possible to preferably use ceramics to which the ceramic green sheet-laminating method is applicable as described later on. Specifically, the material includes, for example, materials containing a major component of zirconia represented by fully stabilized zirconia and partially stabilized zirconia, alumina, magnesia, silicon nitride, aluminum nitride, and titanium oxide, as well as materials containing a major component of a mixture of them. However, in view of the high mechanical strength and the high toughness, it is preferable to use a material containing a major component of zirconia, especially fully stabilized zirconia and a material containing a major component of partially stabilized zirconia. The metal material is not limited provided that it has rigidity. However, the metal material includes, for example, stainless steel and nickel. (Column 19. lines 1-17).

Thus, *Takeuchi et al.* merely discloses materials for a ceramic green sheet lamination. Nothing in *Takeuchi et al.* shows, teaches or suggests a base and pair of movable arms forming a U-shape, a static part coupled with the base between the pair of movable arms to form a E-shape and the static part spaced from the pair of movable arms and the head section via a gap as claimed in claims 1 and 33.

A combination of the references would merely suggest to attached the head section of *Yanagisawa* with the structural elements 42a, 42b of *Novotny* where the structural elements are made of the green sheet of *Takeuchi et al.* Thus, nothing in the combination of *Yanagisawa*, *Novotny* and *Takeuchi et al.* show, teach or suggest a) a static part spaced from a pair of movable arms and a head section, b) a base and pair of movable arms forming a U-shape and c) a static part coupled with the base between the pair of movable arms to form a E-shape as claimed in claims 1

and 33, Applicants respectfully request the Examiner withdraws the rejection to claims 1 and 33 under 35 U.S.C. §103.

Claims 8, 11, 31-32 and 34-37 recite additional features. Applicants respectfully submit that claims 8, 11, 31-32 and 34-37 would not have been obvious within the meaning of 35 U.S.C. §103 over *Yanagisawa*, *Novotny* and *Takeuchi et al.* at least for the reasons as set forth above. Therefore, Applicants respectfully request the Examiner withdraws the rejection to claims 8, 11, 31-32 and 34-37 under 35 U.S.C. §103.

Thus, it now appears that the application is in condition for reconsideration and allowance. Reconsideration and allowance at an early date are respectfully requested.

If for any reason the Examiner feels that the application is not now in condition for allowance, the Examiner is requested to contact, by telephone, the Applicants' undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed within the currently set shortened statutory period, Applicants respectfully petition for an appropriate extension of time. The fees for such extension of time may be charged to Deposit Account No. 02-4800.

In the event that any additional fees are due with this paper, please charge  
our Deposit Account No. 02-4800.

Respectfully submitted,

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